Vinyl plastics may develop . . .

Big new outlet for inedible fats

Renderers and packers for years have encouraged research work aimed at finding more uses for inedible animal fats. Industry associations have appropriated large sums of money to research organizations throughout the country for this purpose. As a result new outlets for surplus grease and tallow have been developed. The following article tells about one of these new outlets. It explains how animal fats are being used in the preparation of vinyl plastics. In the words of the author, this new and rapidly growing outlet "is one of the most encouraging aspects of the research picture." This paper, "New Uses for Inedible Animal Fats—Plasticizers," was written for *Western Meat Industry* by Waldo C. Ault of the Eastern Regional Research Laboratory, Eastern Utilization Research Branch, Agricultural Research Service, USDA, Philadelphia.

The production of inedible animal fats and oils in the United States attained an all-time high in 1954, slightly more than 2.6 billion pounds for the crop year. At the same time the amount of these fats used in soap production fell below 1 billion pounds for the first time in over a decade. Nonetheless, prices of these animal fats have increased since the beginning of the present crop year and are higher than a year ago.

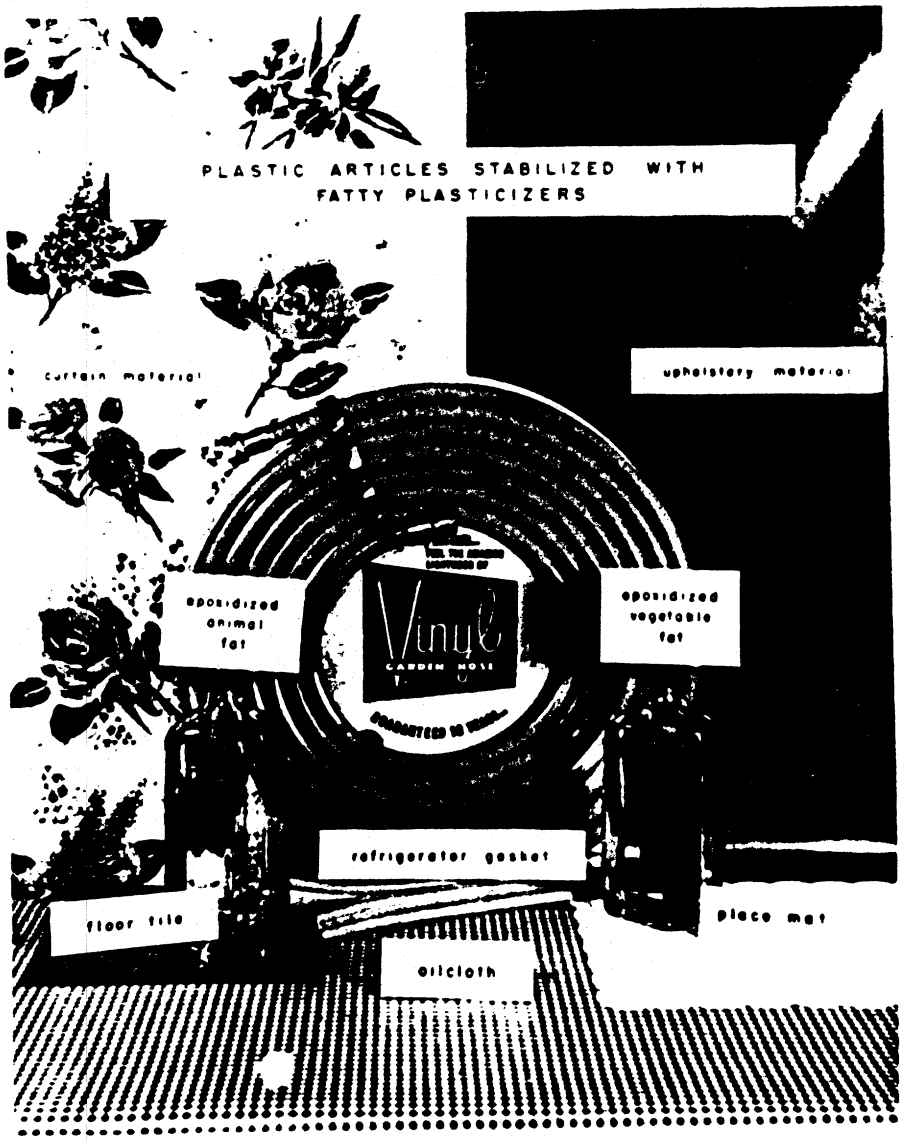
Possibly the most important factor in the reduced stocks and improved price situation for inedible animal fats is the very large volume which continues to move into export channels. During the most recent crop year a total of 1.19 billion pounds of tallow and grease were exported, a notable increase from the 1.07 billion pounds reported for the previous year.

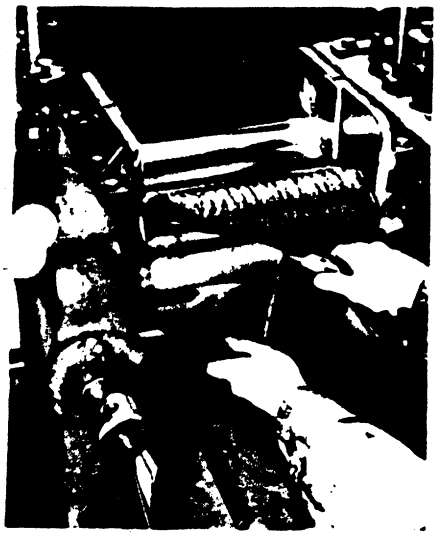
At the same time it seems that research work on the discovery and development of new uses for inedible fats should be credited with playing a considerable role in the improved price situation. The use of animal fats in feeds which came into large scale use during the past year or so has constituted an outlet for a huge quantity of these fats, variously estimated at from 100 to 250 million pounds per year.

This new use resulted largely from exploratory research sponsored by the Eastern Regional Research Laboratory of the U. S. Department of Agriculture and carried out in the nutritional laboratories of the American Meat Institute. These research studies indicated that incorporation of animal fats in dry dog foods and in poultry rations would be nutritionally advantageous. Moreover, the development of methods for using antioxidant combinations to prevent deterioration of the feeds due to rancidity has made such incorporation feasible. Subsequent studies by other groups have served to confirm these findings and extend the list of animals to which fats could be advantageously fed.

Growing Field

The use of fats in the preparation of chemicals is also a new and rap-





PLASTICIZER and pigment being milled into a plastic.

idly growing outlet with which the average renderer or packer is not apt to be so familiar. From the long range point of view the use of fats in the preparation of certain chemicals having industrial outlets is one of the most encouraging aspects of the research picture. These products tend to increase the outlet of fats by connecting them with our industrial expansion and growth rather than solely with our increase in population.

A typical example of such a new use for fats resulting from research is found in the case of ıe stabilizing plasticizers which nave come into widespread use in the formulation of vinyl plastics.

It is difficult to define the term plasticizer in a few words. In general, however, plasticizers are softening agents, usually high boiling liquids, which are added to hard, horny resins to yield the familiar flexible films, plastic sheets and forms. The plasticizers improve the workability of the materials and contribute desirable properties to the finished product.

Tremendous Outlet

Plasticizer production in the United States has increased approximately tenfold since 1939, from about 30 million pounds that year to over 300 million pounds in 1954. It has been predicted that by 1975 plasticizer production will be three times that of today or nearly one billion pounds per year. Such an outlet for fats is worth striving for.

Fats, oils and many of their simple derivatives have most of the properties desirable in plasticizers such as good color and color stability, freedom from undesirable odor and uniformity and low vapor pressure with consequent freedom from loss by evaporation. Moreover, since most plasticizers currently sell at about 30 cents per pound or more, their use generally offers some economic advantage.

Lack of compatibility with commercially important polymers, especially the vinyls, however, has restricted the use of fats and their derivatives for this purpose. This lack of compatibility can be overcome only by chemical modification of the fatty material. Attempts to use the unmodified fat directly only results in a sticky, useless mass which cannot be handled at all.

Numerous ways for chemical modification of the basic fatty materials are available. The trick is to find a cheap method for preparing fat derivatives which will be compatible with the widely used vinyl resins and at the same time will offer some plus values.

By a derivative having plus value we mean one which will offer the user some specific advantage which he cannot obtain in any other way. For example, a new plasticizer which conferred unusual light stability on a composition prepared from vinyl chloride would offer a very worthwhile plus value to a manufacturer of plastic garden hose.

Big Production

Actually, such a product derived from fats has been described by workers of the Eastern Utilization Research Branch of the U. S. Department of Agriculture. These compounds, known to the chemist as epoxidized oils, are being manufactured and sold by a number of companies to an extent estimated to exceed 5 million pounds per year.

Despite the stabilizing action exerted on vinyl compositions by the epoxidized oils their further growth has been confined by their limited compatibility. This means that additional research work will be necessary if a further substantial segment of the 300 million pounds per year market for plasticizers is to be won for fats and their derivatives.

Renderers sponsor studies to find more uses for animal by-products

National Renderers Association has announced sponsorship of several research projects for developing more uses for animal by-products.

At a recent director's meeting the board approved a study of utilization of animal proteins. The association will provide funds up to $12,000 to finance the project by the USDA Agricultural Research Service, Eastern Utilization Research Branch, Philadelphia.

The study will provide more information about the chemical nature of proteins in meat scraps and tankage, and of the amino acid composition of fatty tissue proteins.

Other research projects approved include a study of animal protein feeding for hogs to be conducted at North Carolina State College, and a similar study for poultry to be made by the University of California. These represent two of the four two-year fellowships recently approved by the directors.

The North Carolina project will evaluate the efficiency of the nutrients in meat meal when fed to swine with various combinations of other ingredients. Digestibility studies will be conducted with pigs fed the different diets. Carcass characteristics, including back-fat thickness, iodine number, subjective firmness appraisal and quality value will be determined.

The California project will determine the nutritive value of meat meal for poultry from two standpoints: evidence for anti-metabolites and lysine stability.

Directors also approved the tallow committee's recommendation to continue studies on animal fat at the American Meat Institute Foundation. The contract will continue for a year from Sept. 30.

Recommended specifications for quality meat meal will be presented soon to association members. In order to have them acceptable to both buyers and sellers, a committee will meat with the American Feed Manufacturers Association this month to work out suitable specifications.

The associations 1955-56 budget is being worked out for final approval at the renderers' annual meeting in November.

Richard Mortimer, president of the Pacific Coast Renderers Association, and Lloyd Hygelund, were the western members represented at the national directors' meeting.